Out of Africa: response to Ebola in the developed world; lessons for the future

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The unprecedented, ongoing Ebola virus disease (‘Ebola’) outbreak in West Africa has caused nearly 28 000 cases and more than 11 000 deaths between December 2013 and July 2015, including 876 cases and 509 deaths among healthcare workers (HCW). It is over 60 times larger than any of 26 previous outbreaks, since 1976 when Ebola was first recognised, the largest of which involved ~450 cases (Figure 1). It is the first to have occurred in West Africa and spread across national borders, to major cities and beyond Africa.

It came to attention in March 2014, when the Guinean Ministry of Health notified WHO of a ‘mysterious disease’ that had been occurring in Guéckédou province, since December. Although it had not previously occurred in the region, Ebola was confirmed a week later. By the end of March, cases were reported in neighbouring Liberia and, later, Sierra Leone.

Despite warnings from Médicins sans Frontières (MSF), in June 2014, that the outbreak was out of control and increasingly urgent calls for international help, there was little response until August, when two American aid-workers were evacuated to USA from Liberia, with Ebola. A week later (8 August), WHO belatedly acknowledged that the outbreak was ‘a public health emergency of international concern’. In early September, when the grossly inadequate local health workforce had been further depleted by HCW deaths and patients were being turned away from overcrowded hospitals, an increasingly frustrated MSF President denounced the ‘dangerously inadequate’ international response as a ‘coalition of inaction’ and challenged the West to provide people rather than financial promises. Within two weeks, the US president announced deployment of 3000 military personnel to build treatment centres and train HCWs. On 18 September the UN Security Council declared the outbreak ‘a threat to international peace and security’ and established the Mission for Ebola Emergency Response (UNMEER), with powers similar to that of a peacekeeping mission – the first of its kind for a health emergency.

Meanwhile, the American aid-workers had recovered after several weeks’ treatment in the high security containment facility at the Emory University Hospital, which had been built by the Centers for Disease Control (CDC) to care for returning aid-workers with highly transmissible diseases. The CDC had reassured Americans that there was minimal public risk (Figure 2), since Ebola spreads only by contact with blood or body fluids of patients in the ‘wet’ stage of the disease – not by the respiratory route – and hospital spread could be prevented by strict droplet and contact precautions.

This reassurance was first challenged when a nurse became ill, after caring for a Spanish priest, who had died from Ebola in Madrid after being evacuated from West Africa. Then, a Liberian-American man, who had recently returned from Liberia, was admitted to hospital in Dallas, Texas, seriously ill with abdominal pain and diarrhoea; Ebola was diagnosed two days later. When two nurses who had cared for him became ill with Ebola there was a storm of recrimination and fear in America. The CDC Director, Tom Frieden, suggested, reasonably, that the nurses’ infections had resulted from breaches of infection control (IC) protocol; this infuriated the nurses’ union, who claimed the hospital had no protocols. Frieden apologised for apparently blaming the nurses, but pointed out that all hospitals should have appropriate transmission-based IC protocols.

Nevertheless, CDC changed their IC guidelines and recommended personal protective equipment (PPE) to include respiratory route
protection by using P2/N95 mask or powered air-purifying respirator (PAPR), rather than just a water-repellent surgical mask. They also recommended complete coverage of all mucous membranes, skin and hair and scrupulous care with removal. It was not clear exactly how the nurses became infected, but hasty removal of PPE carries a high risk of skin and/or mucous membrane contamination. CDC recommended intensive and repeated training of staff, short shifts (to prevent excessive sweating and fatigue) and supervision by a ‘buddy’, to provide reassurance, check integrity of PPE and ensure its removal in correct sequence.

In the circumstances, these recommendations were reasonable for care of patients with ‘wet’ Ebola and were reflected in the IC guidelines of most western countries, including Australia. However, there was controversy about what PPE should be used for initial management of people who had recently been in an affected country, possibly had contact with Ebola, had ‘dry’ symptoms, such as fever, headache, malaise but not vomiting, diarrhoea or bleeding and were awaiting test results. In Australia and elsewhere, some authorities, evoking the precautionary principle, advocated full PPE, as for care of a ‘wet’ case; they feared that the high toll among African HCWs indicated increased virulence and/or transmissibility of Ebola virus and cited unconfirmed reports of possible respiratory transmission. Others strongly advocated ‘routine’ contact and droplet precautions because (a) PPE was widely available and HCWs were familiar with its use; (b) there were other explanations for high HCW infection rates in Africa and no evidence of increased transmissibility or virulence; and (c) the diagnosis was far more likely to be a common traveller’s infection, such as malaria, and excessive caution could delay appropriate diagnosis and management. In general, the latter, moderate view prevailed.

There was further controversy, when a MSF volunteer, developed Ebola 6 days after returning to New York from Guinea. According to protocol he had taken his temperature twice daily and immediately reported to hospital when it rose. Although quarantine was not required while he remained well – asymptomatic people do not spread Ebola virus – some media and politicians accused him of recklessly endangering public safety. The New York and New Jersey governors announced that, in future, anyone returning from an Ebola-affected country, after possible contact, would be quarantined for the 21-day incubation period. After a volunteer

![Figure 1. Ebola cases by location in Africa.](image-url)
nurse was summarily quarantined in New Jersey, MSF objected strongly because, like CDC and the White House, they pointed out that it was unnecessary and would discourage HCWs from volunteering.

Meanwhile, the tide had begun to turn in Africa, due to the coordinated efforts of UNMEER, local and foreign government agencies and NGOs which had established treatment units, community care centres and laboratories and trained many more foreign and local HCWs, contact tracers and safe burial teams. On 9 May 2015, Liberia was declared Ebola-free but, at the time of writing (July 2015), cases are still occurring – albeit in much reduced numbers – in Sierra Leone and Guinea and six new cases have occurred in Liberia. The threat is not over, but the turnaround confirms past experience, that Ebola outbreaks can be controlled relatively quickly, once the necessary ‘staff, stuff, space and systems’ are available. A rapid response to MSF’s warnings and pleas for help, in June 2014, could have prevented much of what followed. Criticism of WHO for its slow response was justified and has been acknowledged by the Director-General; but WHO was not – and still is not – adequately

Figure 2. CDC fact sheet on Ebola in the USA.

You can only get Ebola from

- The body fluids of a person who is sick with or has died from Ebola.
- Objects contaminated with body fluids of a person sick with Ebola or who has died of Ebola.
- Infected fruit bats and primates (apes and monkeys).
- And, possibly from contact with semen from a man who has recovered from Ebola (for example, by having oral, vaginal, or anal sex).
resourced to respond, rapidly, to infectious disease emergencies. A concerted international effort will be needed to establish a global emergency response workforce and build resilient health systems in developing countries, including hospitals with adequate supplies of PPE and appropriately trained healthcare workers.

The threat to HCWs in developed countries from imported Ebola and the high mortality among African HCWs focussed attention on hospital IC like nothing before. Many hospitals spent a fortune preparing facilities and staff for a possible Ebola case, often in the context of previously dwindling IC budgets and poor staff compliance with IC practices. Has this experience, taught us how to stop the next infectious disease emergency at its source and avoid the desirable scramble, elsewhere, to train and equip hospital staff for what should be ‘business as usual’? Without strong political and professional leadership there is a risk that, once the crisis passes, lessons will be forgotten, funds redeployed and bad habits reinstated.

References
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